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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,311	08/27/2003	Sathya P. Kaginele	M4065.0931/P931	4875

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EXAMINER	
TU, CHRISTINE TRINH LE	
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2138	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/648,311	KAGINELE, SATHYA P.	
	Examiner	Art Unit	
	Christine T. Tu	2138	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/06/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12-14,17,19-23,30,32-36 and 38-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12-14,17,19-23,30,32-36 and 38-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 101 and 35 USC § 112, 1st paragraph

2. Claims 12 and 20 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific asserted utility or a well established utility.

Claims 12 and 20 are amended with the limitation of "after confirming proper operation of a control line **used to generate** a signal on the **word line**". In other words, what is being recited is that a control line generates a signal on the word line. Such limitation, however, is not support by the specification nor the drawings.

In Figures 3, there is no signal from any control line being directly connected to any wordline (WL) (132).

Claims 12 and 20 also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a specific asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

3. Claims 1-10, 12-14, 17, 19-23, 30, 32-36, and 38-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichiriu (7,002,823) in view of Nataraj et al. (6,944,039 and Nataraj hereinafter).

Claims 1-2:

Ichiriu discloses the invention substantially as claimed. Ichiriu shows (figures 1 & 5) that, in a CAM device (100), a CAM array (101) includes a plurality of CAM cells arranged in rows for storing CAM words. Each CAM cell (201) includes a compare circuit to compare the content of the memory cell with a comparand signal. A comparand register (115) is used to store a comparand value received via the comparand bus (143) and outputs the comparand value to the CAM array (101). During a compare operation, the comparand may be masked by a global mask value, and then compared simultaneously with all the CAM words stored in the CAM array. Each of the rows of CAM cell is coupled to a corresponding match line (182) and any match between the comparand and a valid CAM word results in a match signal being output to the flag circuit (112). The flag circuit (112) then outputs a match flag signal to indicate that a match has occurred (figures 1 and 5, column 3 line 29 - column 4 line 34, column 6 lines 42-47).

Ichiriu states that a decoder (103) inside the CAM device (100) decodes a selected address to activate one of a plurality of word lines (181) (column 5 lines 17-23, column 3 lines 54-56).

Ichiriu also states at the start of a comparison operation, a feature of precharging each of the match lines (182) to a high logical level (column 6 line 61-column 7 line 4).

Ichiriu further states that, during a compare operation, a respectively portion of the comparand is applied to each column of CAM cells (201) via lines CL/CLB such that the complete comparand is applied to each row of the CAM cells (201) simultaneously. In one embodiment, each of the match lines (182) is precharged to a high logical level at the start of a comparison operation, but pulled down to a low logical level by the compare circuit with any attached CAM cell (201) that receives comparand signals which do not match the stored data value. In this configuration, any match line (182) NOT pull low constitutes a match signal (figure 5, column 6 line 61-column 7 line 4).

Ichiriu does not explicitly teach the feature of confirming proper operation of a control line used to enable output from a match line under test and the feature of enabling output from the match line under test.

Nataraj, however, teaches (figure 4) that a match latch circuit (203) comprises latching circuits (221), each latching circuit comprises an AND gate (223) and a latch element (225). Each AND gate (223) has a first input coupled to receive a detect signal (224) and a second input coupled to a corresponding one of the match lines (241). The AND logic gate (223) outputs a logic-level match signal in high or low state according to whether the signal level of the corresponding match line is above or below a threshold. The latch signal (226) is supplied to a latch enable input of the latch element (225) enables the logic-level match signal to pass through the latch element (225) (figure 4, column 48-62).

It would have been obvious to one skilled in the art at the time the invention was made to use Nataraj's match latch circuit (203) having the plurality of AND gates (223)

and plurality of latch elements (225) such that each latch element (225) is enabled to pass/output a match signal [generated by a AND gate (223)] to Ichiriu's priority encoder (114) and Ichiriu's FLAG circuit (112). One having ordinary skill in the art would be motivated to combine the teachings of Ichiriu and Nataraj because the combination of Ichiriu's priority encoder [114] & FLAG circuit [112] and Nataraj's priority encoder/flag logic circuit (215) comprises inputs of match signals and outputs of match addresses and match flag (Ichiriu: figure 1, column 3 line 64-column 4 line 13; Nataraj: figure 4, column 7 line 1-15).

Claim 3:

Ichiriu teaches that the CAM array (101) includes circuitry to force validity value with each validity storage cell (202) to a reset state to prevent assertion of a match signal by pulling the match line low for the corresponding row of CAM cells (column 7 lines 49-65, column 8 lines 20-24).

Claims 4-5:

Ichiriu's decoder (105) is a state machine that transitions from state to state in response to transitions of a clock signal (CLK) (104) (column 4 lines 57-67).

Claims 6-7:

Ichiriu teaches that each row of CAM cells (201) is coupled to a respective match line (182) (figure 5, column 6 lines 33-37).

Claims 8-9:

Ichiriu discloses the invention substantially as claimed. Ichiriu shows (figure 1) that a CAM array (101) includes a plurality of CAM cell arranged in rows for storing CAM words. Each CAM cell (201) includes a compare circuit to compare the content of the memory cell with a comparand signal. A comparand register (115) is used to store a comparand value received via the comparand bus (143) and outputs the comparand value to the CAM array (101). During a compare operation, the comparand may be masked by a global mask value, and then compared simultaneously with all the CAM words stored in the CAM array. Each of the rows of CAM cell is coupled to a corresponding match line (182) and any match between the comparand and a valid CAM word results in a match signal being output to the flag circuit (112). The flag circuit (112) then outputs a match flag signal to indicate that a match has occurred (figure 1, column 3 line 29 - column 4 line 34, column 6 lines 42-47).

Ichiriu does not explicitly teach the feature of confirming proper operation of a control line used to enable output from a match line under test and the feature of enabling output from the match line under test.

Nataraj, however, teaches (figure 4) that a match latch circuit (203) comprises latching circuits (221), each latching circuit comprises an AND gate (223) and a latch element (225). Each AND gate (223) has a first input coupled to receive a detect signal (224) and a second input coupled to a corresponding one of the match lines (241). The AND logic gate (223) outputs a logic-level match signal in high or low state according to whether the signal level of the corresponding match line is above or below a threshold.

The latch signal (226) is supplied to a latch enable input of the latch element (225) enables the logic-level match signal to pass through the latch element (225) (figure 4, column 48-62).

It would have been obvious to one skilled in the art at the time the invention was made to use Nataraj's match latch circuit (203) having the plurality of AND gates (223) and plurality of latch elements (225) such that each latch element (225) is enabled to pass/output a match signal [generated by a AND gate (223)] to Ichiriu's priority encoder (114) and Ichiriu's FLAG circuit (112). One having ordinary skill in the art would be motivated to combine the teachings of Ichiriu and Nataraj because the combination of Ichiriu's priority encoder [114] & FLAG circuit [112] and Nataraj's priority encoder/flag logic circuit (215) comprises inputs of match signals and outputs of match addresses and match flag (Ichiriu: figure 1, column 3 line 64-column 4 line 13; Nataraj: figure 4, column 7 line 1-15).

Claim 10:

Ichiriu teaches that a comparand value is stored to the CAM array (101). Ichiriu also teaches that the results of any match between the comparand and a valid CAM word are outputted to a priority encoder (114) for outputting a CAM index (174), such a CAM index is an address of the CAM word corresponding to the selected match signal (column 4 lines 1-8).

Claims 12 and 14:

Ichiriu discloses the invention substantially as claimed. Ichiriu shows (figures 5 and 1) that a CAM array (101) includes a plurality of CAM cells (201) arranged in rows and columns, with each row of CAM cells (201) being coupled to a respective word line and to a respectively match line (182). Each CAM (201) includes a compare circuit to compare the content of the memory cell with a comparand signal (figure 5, column 6 line 33-column 7 line 13).

Ichiriu does not explicitly teach a circuit for determining a status of the match line under tested based on result of a search operation and a signal on the match line after confirming proper operation of a control line used to generate a signal.

Nataraj, however, teaches (figure 4) that a match latch circuit (203) comprises latching circuits (221), each latching circuit comprises an AND gate (223) and a latch element (225). Each AND gate (223) has a first input coupled to receive a detect signal (224) and a second input coupled to a corresponding one of the match lines (241). The AND logic gate (223) outputs a logic-level match signal in high or low state according to whether the signal level of the corresponding match line is above or below a threshold. The latch signal (226) is supplied to a latch enable input of the latch element (225) enables the logic-level match signal to pass through the latch element (225) (figure 4, column 48-62).

It would have been obvious to one skilled in the art at the time the invention was made to use Nataraj's match latch circuit (203) having the plurality of AND gates (223) and plurality of latch elements (225) such that each latch element (225) is enabled to

pass/output a match signal [generated by a AND gate (223)] to Ichiriu's priority encoder (114) and Ichiriu's FLAG circuit (112). One having ordinary skill in the art would be motivated to combine the teachings of Ichiriu and Nataraj because the combination of Ichiriu's priority encoder [114] & FLAG circuit [112] and Nataraj's priority encoder/flag logic circuit (215) comprises inputs of match signals and outputs of match addresses and match flag (Ichiriu: figure 1, column 3 line 64-column 4 line 13; Nataraj: figure 4, column 7 line 1-15).

Claim 13:

Ichiriu also teaches a priority encoder (114), in responsive to the results of any match between the comparand and a valid CAM word, for outputting a CAM index (174), such a CAM index is an address of the CAM word corresponding to the selected match signal (column 4 lines 1-8).

Claim 17:

Ichiriu discloses the invention substantially as claimed. Ichiriu shows (figure 5) that a CAM array (101) includes a plurality of CAM cells (201) arranged in rows and columns, with each row of CAM cells (201) being coupled to a respective word line. Each CAM (201) includes a compare circuit to compare the content of the memory cell with a comparand signal. Each of the match lines (182) is precharged to a high logical level at the start of a comparison operation, but pulled down to a low logical level by the compare circuit within any attached CAM cell (201) that receives comparand signal

which do not match the stored data value. In this configuration, any match line (182) not pulled low constitutes a match signal (figure 5, column 6 lines 33-column 7 line 13).

Ichiriu does not explicitly teach the enabling circuitry for enabling a match line after confirming proper operation of a control line.

Nataraj, however teaches (figure 4) that a match latch circuit (203) comprises latching circuits (221); each latching circuit (221) comprises an AND gate (223) and a latch element (225). Each AND gate (223) has a first input coupled to receive a detect signal (224) and a second input coupled to a corresponding one of the match lines (241). Each of latch elements (225), in response to a latch signal, enables the corresponding logic-level match signal to pass through the latch element (225) after a corresponding AND gate (223), in responsive to a detect signal, outputs a logic-level match signal in high or low state according to whether the signal level of the corresponding match line is above or below a threshold (figure 4, column 48-62).

It would have been obvious to one skilled in the art at the time the invention was made to use Nataraj's match latch circuit (203) having a plurality of AND gates (223) and a plurality of latch elements (225) such that each latch element (225) is enabled to pass/output a match signal [generated by a AND gate (223)] to Ichiriu's priority encoder (114) and Ichiriu's FLAG circuit (112). One having ordinary skill in the art would be motivated to combine the teachings of Ichiriu and Nataraj because the combination of Ichiriu's priority encoder (114) & FLAG circuit (112), and Nataraj's priority encoder/flag logic circuit (215) comprises inputs of match signals and outputs of match addresses

and match flag (Ichiriu: figure 1, column 3 lines 64-column 4 line 13; Nataraj: figure 4, column 7 line 1-15).

Claim 19:

Ichiriu teaches that each row of CAM cells (201) is coupled to a respective word line (181) and to a respective match line (182) (figure 5, column 6 lines 35-37).

Claims 20-21:

These claims are similar to claims 17 and 19 with additional recited control circuitry for resetting the enabling circuitry. Ichiriu teaches that the CAM array (101) includes circuitry to force validity value with each validity storage cell (202) to a reset state to prevent assertion of a match signal by pulling the match line low for the corresponding row of CAM cells (column 7 lines 49-65, column 8 lines 20-24).

Claim 22:

Ichiriu teaches that a comparand value is stored to the CAM array (101). Ichiriu also teaches that the results of any match between the comparand and a valid CAM word are outputted to a priority encoder (114) for outputting a CAM index (174), such a CAM index is an address of the CAM word corresponding to the selected match signal (column 4 lines 1-8).

Claim 23:

This claim is similar to claim 12 except the additional recited processor and the additional recited circuit for determining a status of a write enable signal to generate a signal on the word lines.

Ichiriu teaches that a system (960) includes a CAM device (961), a CPU (962) and a network processing unit (NPU) (963) (figure 38, column 37 lines 26-45). Ichiriu also teaches an address circuit (103) includes an address selector (125) that responds to the select signal (118) by selecting an address (178) so that an address decoder (127) decodes the selected address (178) to activate one of a plurality of word lines (181) (figures 1 and 2, column 5 lines 17-27).

Claim 30:

Ichiriu discloses the invention substantially as claimed. Ichiriu shows (figure 5) that a CAM array (101) includes a plurality of CAM cells (201) arranged in rows and columns, with each row of CAM cells (201) being coupled to a respective word line. Each CAM (201) includes a compare circuit to compare the content of the memory cell with a comparand signal. Each of the match lines (182) is precharged to a high logical level at the start of a comparison operation, but pulled down to a low logical level by the compare circuit within any attached CAM cell (201) that receives comparand signal which do not match the stored data value. In this configuration, any match line (182) not pulled low constitutes a match signal (figure 5, column 6 lines 33-column 7 line 13).

Ichiriu does not explicitly teach the enabling circuitry for enabling a match line.

Nataraj, however teaches (figure 4) that a match latch circuit (203) comprises latching circuits (221); each latching circuit (221), in responsive to a latch signal and a detect signal, outputs a logic-level match signal in high or low state according to whether the signal level of the corresponding match line is above or below a threshold (figure 4, column 48-62).

It would have been obvious to one skilled in the art at the time the invention was made to use Nataraj's match latch circuit (203) having a plurality of latching circuits (221), each of which to pass/output a match signal to Ichiriu's priority encoder (114) and Ichiriu's FLAG circuit (112). One having ordinary skill in the art would be motivated to combine the teachings of Ichiriu and Nataraj because the combination of Ichiriu's priority encoder (114) & FLAG circuit (112), and Nataraj's priority encoder/flag logic circuit (215) comprises inputs of match signals and outputs of match addresses and match flag (Ichiriu: figure 1, column 3 lines 64-column 4 line 13; Nataraj: figure 4, column 7 line 1-15).

Claims 32:

Claim 32 is rejected for reasons similar to those set forth against claim 19.

Claims 33-34:

These claims are similar to claim 30 with additional recited control circuitry for resetting the enabling circuitry. Ichiriu teaches that the CAM array (101) includes

circuitry to force validity value with each validity storage cell (202) to a reset state to prevent assertion of a match signal by pulling the match line low for the corresponding row of CAM cells (column 7 lines 49-65, column 8 lines 20-24).

Claim 35:

Ichiriu teaches that a comparand value is stored to the CAM array (101). Ichiriu also teaches that the results of any match between the comparand and a valid CAM word are outputted to a priority encoder (114) for outputting a CAM index (174), such a CAM index is an address of the CAM word corresponding to the selected match signal (column 4 lines 1-8).

Claims 36 and 38:

These claims are similar to claims 30 and 32 except that a router is being recited. Ichiriu teaches a routing device including a CAM device (961) (figure 38, column 37 lines 26-45).

Claim 39:

This claim is similar to claim 33 except that a router is being recited. Ichiriu teaches a routing device including a CAM device (961) (figure 38, column 37 lines 26-45).

Claims 40-41:

Claims 40-41 are rejected for reasons similar to those set forth against claims 34-35.

Claim 42:

This claim is similar to claims 1 and 12 with additional processing system having a processor. Ichiriu shows a system (960) including a CAM device (961), a CPU (962) and a network processing unit (NPU) (963) (figure 38, column 37 lines 26-45).

Response to Arguments

4. Applicant's arguments with respect to the amended claims have been considered but are moot in view of the new ground(s) of rejection.

For claims 1, 8, 42, applicant argues that there is no teaching of "confirming proper operation of a control line used to enable output from a match line under test and enabling output from the match line" in Ichiriu. However, these limitations are now taught by combination references of Ichiriu and Nataraj (see rejections in ¶3 above).

For amended claims 12, 17, 20 and 23, these claims are also now taught by combination references of Ichiriu and Nataraj (see rejections in ¶3 above). Applicant is also requested to review claims12 and 20 due to 101 and 112, 1st paragraph rejections (see ¶2 above) in this claim.

For claims 30, 33, 36 and 39, these claims are now rejected under new ground of rejections by using combination references of Ichiriu and Nataraj (see rejections in ¶3 above).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine T. Tu whose telephone number is (571) 272-3831. The examiner can normally be reached on Mon-Thur. 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Christine T. Tu
Primary Examiner
Art Unit 2138

August 3, 2006